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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/054,281	01/22/2002	Takeo Oita	1503.66132	6323

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EXAMINER
SHINGLETON, MICHAEL B

ART UNIT	PAPER NUMBER
2817	

DATE MAILED: 05/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
10/054,281	Oita
Examiner	**Group Art Unit**
SHINGLETON	2817

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE Three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☐ Responsive to communication(s) filed on _____.

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-14 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1, 2, 4-8, 10-14 is/are rejected.

☒ Claim(s) 3 and 9 is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☒ All ☐ Some* ☐ None of the:

☒ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____.

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____.

Attachment(s)

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Interview Summary, PTO-413

☐ Notice of Informal Patent Application, PTO-152

☐ Other _____

Office Action Summary

DETAILED ACTION

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: A crystal oscillator that utilizes the power transistor of an output amplifier to heat the crystal resonator.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5, 6, 8 and 13 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Satoh et al. 6,147,565 (Satoh).

Figure 1(a) of Satoh discloses a crystal oscillator having an oscillation unit (oscillation means) composed of at least a crystal vibrator 8. As with all crystal vibrators, the crystal vibrator 8 has a frequency-temperature characteristic with which a resonance frequency changes with temperature. The oscillation circuit 2 forms "an oscillation circuit unit". Element 12 (heat source means, heat source unit) is a power transistor that abuts up against the crystal vibrator 8 and keeps the temperature above a certain level such that the crystal does not oscillate abnormally (See column 6, around line 42 and note column 1, around line 8 where Satoh recites that the oscillation is of "high stability".). As noted by applicant in the specification some crystals have micro-jumps at cold temperatures. Since Satoh keeps the crystal at a warm temperature (A temperature that results in "high stability".), the temperature of non-stability, i.e. the abnormality caused by "micro-jumps" is avoided.

Claims 6, 12, 13 and 14 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Block 4,593,258 (Block).

As shown in the only Figure, Block discloses a crystal oscillator having an oscillation means (oscillation unit) composed of a crystal vibrator 30 and a heat source (heat source unit, heat source means) 20 that is for keeping the temperature of the crystal vibrator at a warm temperature such the frequency remains constant, i.e. stable, normal (See column 1, lines 16-35). Since Block keeps the crystal at a warm temperature (A temperature that results in high stability.) the temperature of non-stability, i.e. low

temperatures where abnormal oscillation can occur, is avoided. Block also discloses a signal oscillation method that prevents abnormal oscillation of the oscillator having a crystal vibrator by operating the crystal vibrator 30 at a warm, normal temperature that avoids the low temperatures where abnormal oscillation can occur (See above). Block does this by sensing the temperature via elements like element 40 that outputs a signal in a state where the temperature is kept. This temperature "range" is set for stable frequency generation that means that the temperature of the crystal vibrator is kept higher than a temperature where the crystal vibrator causes abnormal oscillation. Block also employs a control unit composed of elements like sensor 40 that senses the temperature of the crystal vibrator and controls the heat generated by the heat source unit (See column 2, lines 67 and 68,and column 3, lines 1-44).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4, 5, 7, 8, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Block 4,593,258 (Block) in view of Tooley "Electronic Circuits Handbook" (Tooley) and Satoh et al. 6,147,565 (Satoh).

Block discloses an energy conserving apparatus that includes a crystal oscillator (See the Figure.). The oscillation unit (oscillation means) is composed of at least a crystal vibrator 30 and like all "crystal vibrators" has a frequency-temperature characteristic with which a resonance frequency changes with temperature. The Figure clearly points to "oscillator circuitry" which forms "an oscillation circuit unit". Power supply 20 (heat source means, heat source unit) abuts up against the crystal 30 so as to heat the crystal to above a certain level such that the crystal does not oscillate abnormally (See Column 2, around line 40 and Column 1, lines 42-49). As noted by applicant in the specification some crystals have micro-jumps at cold temperatures. Since Block keeps the crystal at a warm temperature (A temperature that results in "high stability".), the abnormality caused by "micro-jumps" is avoided. Block also employs a control unit composed of elements like sensor 40 that senses the temperature of the crystal vibrator and

controls the heat generated by the heat source unit (See column 2, lines 67 and 68,and column 3, lines 1-44).

Block is silent concerning the power transistors of the power supply circuitry being abutted against the crystal vibrator and Block does not show the power supply 20 as being composed of power transistors. Block shows a generic power supply 20 in the Figure.

Tooley teaches a variety of conventional power supply regulator circuits that employs a power transistor. Note Figures 3.28 and 3.29 as well as the top of page 66 of Tooley.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted one of the power supplies shown in Tooley that employs a power transistor in place of the generic power supply of Block because, as the reference is silent as to the specific structure of the power supply employed, any art-recognized equivalent power supply would have been usable such as the conventional ones shown by Tooley.

Satoh teaches the optimum placement of the power transistor so as to provide the best thermal energy transfer by abutting the power transistor against the crystal vibrator. Note that Satoh is for low power consumption and as one of routine skill would realize placing the heating element with a poor thermal conductive path to the crystal vibrator would result in high power consumption for it would take more energy to heat the crystal.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the power transistor that makes up the power supply abut up against the crystal vibrator so as to provide for the most efficient energy transfer to the crystal as taught by Satoh.

Block is silent on what the exact temperature the crystal vibrator is set at except that this temperature is warm temperature due to the warming nature of the heating elements. Selecting the optimum or workable temperature range for the crystal vibrator involves but routine skill in the art.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to keep the temperature of the crystal vibrator at a temperature higher than 0 degrees C as this is merely the selection of the optimum or workable range that involves but routine skill in the art.

Allowable Subject Matter

Claims 3 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record fails to show or suggest the use of the power transistor that amplifies the oscillation output and heats the crystal vibrator.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure Shmaly, Morokawa and Kawashima all show state of the art crystal oscillator circuits.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is 703-308-4903. The examiner can normally be reached on Monday-Thursday from 8:00 to 4:30. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal, can be reached on (703) 308-4909. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

MBS
April 28, 2003

MICHAEL B SHINGLETON
PRIMARY EXAMINER
GROUP ART UNIT 2817